

LESOTHO HIGHLANDS DEVELOPMENT AUTHORITY

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CONTRACT 1204

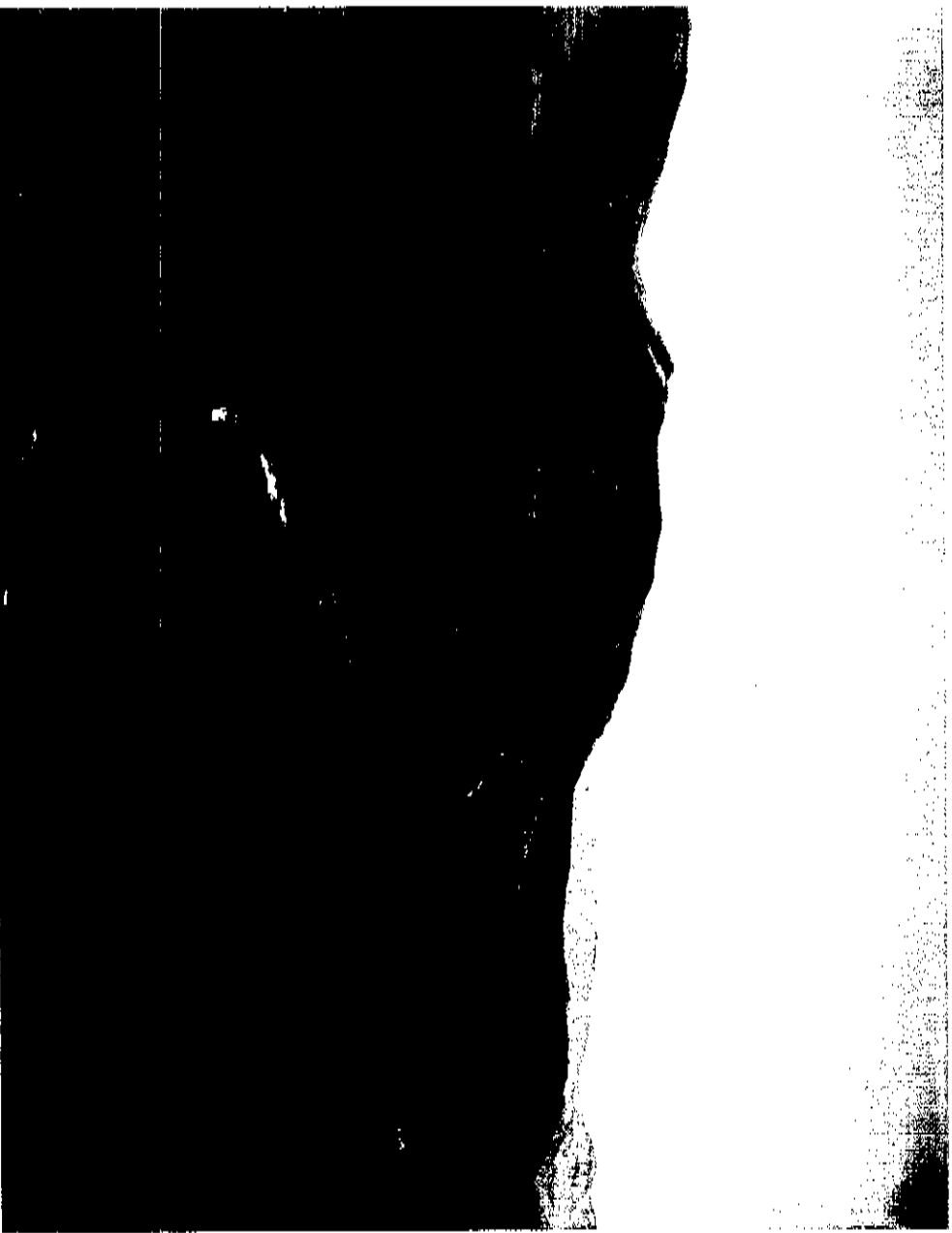
"Consultancy and Project Management Services to develop socio-economic protocols for areas downstream of Phase 1 dams and conduct the socio-economic and epidemiological impact survey downstream of Phase 1 dams."

DOWNSTREAM SOCIAL MONITORING STUDY

VOLUME IV

AVAILABILITY OF SERVICES IN IFR REACHES :

IFR 1, IFR 2, IFR 3, IFR 7 AND IFR 9



Human Sciences Research Council

December 2007



HSRC
Human Sciences
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LIST OF ACRONYMS AND ABBREVIATIONS

AIDS	Acquired Immunodeficiency Syndrome
BOS	Bureau of Statistics
DHS	Demographic and Health Survey
EA	Enumerator area
FOB	Field Operation Branch
GIS	Geographical Information Systems
HIV	Human Immunodeficiency Virus
HSRC	Human Sciences Research Council
IFR	Instream flow requirements. Refers to the magnitude, duration, timing and frequency of flows needed to maintain a riverine eco system
LHDA	Lesotho Highlands Development Authority
LHWP	Lesotho Highlands Water Project
LHWC	Lesotho Highlands Water Commission
LLE	Local legal entity (community trusts created to administer LHDA communal compensation payments).
M&E	Monitoring and Evaluation
NGO	Non-Governmental Organisation
PAR	Population at Risk
TOR	Terms of Reference
VIP:	Ventilated Improved Pit Latrine

DEFINITIONS AND GLOSSARY

Catchment area	Refers to the lateral water catchment areas above the respective dams. Can also be referred to as the local catchment
Client	Refers to LHDA
Contract 1204	Refers to the present study, initiated to conduct a series of socio-economic and health-related surveys in the upstream and downstream areas of the dams in Phase 1 of the LHWP
Consultant	Refers to the HSRC
Impact	Refers to the degree households were influenced by the LHWP. Such impacts could have been negative or positive. Communities in the project areas experienced positive and negative impacts as a result of the LHWP
Phase 1A	Refers to those areas and construction activities around the Katsie and 'Mueña dams, related tunnels, road works and electrical pylons.
Phase 1B	Refers to those areas and construction activities around the Mchale dam and Matsoku weir, related tunnels, road works and electrical pylons. Work on Phase 1B started in 1997 and was completed by 2004.
Part A	First series of tasks to be conducted under Contract 1204. Specifically, it refers to a socio-economic and health survey in the upstream areas of the dams completed in Phase 1 of the LHWP.
Part B	Second component of Contract 1204. Specifically, it refers to a socio-economic and health survey in the areas downstream of the LHWP reservoirs
Project areas	Areas where the LHWP was constructed.
Research team	Refers to the group of professional and technical staff appointed by the HSRC to carry out Contract 1204, supported by designated LHDA staff
Study	The research project conducted by Contract 1204 in the various LHWP areas
Study area	Refers to those areas, where a survey was undertaken
WATSANI	The water and sanitation task team of LHDA installing water systems and VIP's in the 'upstream areas' of the LHWP.

ACKNOWLEDGEMENTS

This is a report on the nutrition and health related findings of the 2006/7 monitoring and evaluation survey conducted in the downstream areas of the Phase 1 reservoirs of the LHW/P (Part B of the Scope of Services of Contract 1204).

The research team would like to thank the respondents living in the downstream areas. They allowed the fieldwork teams to interview them, sacrificing their time and providing personal information. A word of thanks is due the data collection teams of Contract 1204 for their hard work under sometimes trying circumstances.

The following staff members of LHDA provided the research team with assistance and advice during Part B of the broader study: Mr Ramoelisi (LHDA Mohale office), Mr. Leritshoi (LHDA Kaise office), Dr Kisubi, (Technical Supervisor of Contract 1204), Mr Thokoa, (Manager of the Monitoring and Evaluation Branch) and Mr Mothunani (LHDA GIS office for maps and photography).

On the research team side, the following persons played important roles in planning, analysis and report writing: Dr T. Emmett (Review of downstream studies and riverine resource use), Dr M. Faber of the MRC (Nutrition), Mr M. O' Donovan (Analysis) while Ms P. Geerds and Ms M. Rasikela were involved in the exploratory studies that preceded the quantitative survey. Invaluable assistance was provided by the project administrator, Ms C. de Kock while the project manager was Mr J. van Zyl.

Contract 1204
HSRC
December 2007

EXECUTIVE SUMMARY

INTRODUCTION

The Lesotho Highlands Development Authority (LHDA) is committed by the terms of the LHWP Treaty to monitor both the biophysical and socio-economic impacts of reduced flows on areas and communities downstream of the LHWP dams. Following extensive studies in the downstream areas (Contracts 648 and 678), a Policy for Instream Flow Requirements was developed for downstream areas of Phase 1 of the LHWP, together with detailed Procedures for implementation. The purpose of the IFR Policy is to provide for the management of flow releases towards the maintenance of predetermined conditions for riverine ecosystems downstream of Phase 1 dams of the LHWP. The IFR Policy also provides a framework for the determination of resource losses and other impacts in downstream areas and for compensation of affected communities for these losses and impacts.

OBJECTIVES OF THE STUDY

Contract 1204 was tasked to design and conduct a study in the downstream areas of the LHWP to measure the use of riverine resources, the socio-economic and health the status of such communities in order to assess the impacts of the reduced river flows on the affected communities. This report specifically deals with aspects related to nutrition, food security, public health and community services of the population at risk in the selected IFR reaches.

METHODOLOGICAL ISSUES

Contract 1204 conducted a quantitative survey with a randomly selected sample in the various proximal IFR reaches. The purpose was to collect information pertaining to the use of riverine resources by communities living within a five-kilometre zone of the rivers downstream of the main LHWP reservoirs. In addition, information was also collected on household characteristics, income sources, and selected nutritional and health issues.

The sample was drawn from five discreet areas, namely IFR 1, IFR 2, IFR 3, IFR 7 and IFR 9. Each of the IFR reaches was further subdivided into two distance zones. Data collection began in October 2006 and was completed by January 2007.

It should be noted that Contract 648 did not collect nutrition or food security data. Therefore it is not possible in this study to come to any conclusions as to the impact of reduced flows of the rivers on nutritional indicators or not. Very much of the same applies to public health. The approach used by Contract 648 to assess the level of public health in the study area was to list the most common ailments presented at clinics in the study area. The underlying logic was to flag those ailments that can be linked to water such as gastroenteritis and eye complaints. These diseases in theory would be impacted by a reduction in the river flows. However, a major problem in this approach was the fact that only a very small percentage of households (one percent) depend on the main rivers as their water source. Contract 648 did not make a decisive argument or presented any evidence as to why a reduction in river flows will impact significantly on the health of the population (given the aforementioned fact). Another problem of this approach was that it did not allow for generalisation, and particularly to calculate prevalence levels among the population at risk. A protocol was suggested by Contract 648 to conduct a population based survey. However, this was never done.

The lack of baseline data in a number of spheres is complicated by the fact that Contract 648 was done after the flow of the Malibamaiso River had already been altered by the construction of the Kaise Dam.

FINDINGS

Services and amenities

A negligible percentage (1.2%) of respondents used the main rivers as their main source for domestic water. Almost half of the households in the downstream areas source their water from an open well or unprotected springs. Community water systems are used by a quarter of households. This fact is crucial in understanding the possible impact of water-borne diseases on the PAR.

80% of households in the study area did not have a toilet. This impacts on household environmental hygiene with diseases related risks (independent of the flow of the main river).

Approximately 2% of households reported having a full time business enterprise. Given the low levels of disposable income in the downstream areas, the potential impacts of the expansion of local businesses are limited.

CHAPTER 1

INTRODUCTION AND BACKGROUND

1.1 INTRODUCTION

As a joint undertaking of the governments of Lesotho and South Africa, the LHWP is guided by the 1986 Treaty between the two countries. The LHWP Treaty contains 19 Articles of Agreement establishing the rights and responsibilities of each party. These cover *inter alia* the establishment of the Lesotho Highlands Development Authority (LHDA) and the Trans Caledon Tunnel Authority, provisions for cost related payments and financing, royalties, the prevention and settlement of disputes, and those relating to social and environmental considerations. The Treaty governs water flows associated with the LHWP, specifying that rates of flow in the rivers immediately downstream of the Kaise and Mofale dams should not be less than 500 and 300 litres per second respectively, but does not make provision for releases from the Matsoku Weir.

The Treaty also requires that local communities affected by river flows, construction work or other project-related impacts should be able to maintain a standard of living similar to that which obtained before the commencement of the project, and makes provision for compensation to be paid in the case of losses suffered as a result of project-related causes.

1.2 BACKGROUND TO DOWNSTREAM MONITORING OF THE LHWP

In terms of the 1986 LHWP Treaty, the Lesotho Highlands Development Authority (LHDA) is committed to monitor both the biophysical and socio-economic impacts of reduced flows on areas and communities downstream of the LHWP dams. In 2002 the LHDA developed an Instream Flow Requirements (IFR) Policy to address water releases, and environmental and community requirements for Phase 1 dams in the river reaches downstream from the dams. The IFR Policy also sets out the principles for compensating communities for resource losses and other impacts as a result of reduced flows.

The IFR Policy was informed by an extensive research study undertaken by Metsi Consultants on instream flow requirements for river courses downstream of the LHWP dams under contracts LHDA 648 and LHDA 678. The study was “to assess the long-term impacts of modified flow regimes on the ecosystems and communities of the study rivers, provide recommendations for mitigation and compensation, and recommend a long-term monitoring programme” (Metsi Consultants 2000, LHDA 648-F-02: 3). While the final report of this study included guidelines for monitoring socio-economic impacts on downstream communities, based on the reviews of several key stakeholders, the LHDA concluded that “the proposed guidelines would be very costly to implement without generating the outputs required.” (LHDA - Scope of Services for Contract 1204, 2004: 29).

A Lesotho consultant (Sechaba Consultants) was therefore commissioned to re-examine the issue and produce a paper on a conceptual framework for the monitoring protocol using the sustainable livelihoods approach (SLA) and linked to a strongly participatory approach in measuring social welfare changes. This too was turned down by the key stakeholders who felt that the “conceptual approach did not take sufficient cognisance of the particular circumstances, and that further refinement was required.” (Scope of Services, Part B, Contract 1204:29) The IFR Procedures were therefore issued without a final socio-economic monitoring protocol, although a public health protocol was included. The central challenge of the project is therefore seen as developing a

programme that will meet the treaty obligations of the LHDA, while being reasonable in terms of cost.

In August 2004 the LHDA issued a Request for a Proposal for a Proposal to conduct a socio-economic and epidemiology impact survey upstream of Phase 1 dams, *and to develop socio-economic protocols and conduct a socio-economic and epidemiology impact survey downstream of Phase 1 dams*. The contract for this study, LHDA Contract No. 1204, was awarded to the Human Sciences Research Council. The terms of reference for the downstream component of the study comprise Part B of LHDA Contract 1204.

1.3 THE IFR POLICY AND PROCEDURES

From 2002 a Policy for Instream Flow Requirements was developed for downstream areas of Phase 1 of the LHWFP, together with detailed Procedures for implementation. The purpose of the IFR Policy is “to provide for the management of flow releases for the maintenance of predetermined conditions for riverine ecosystems downstream of Phase 1 impoundments” (LHDA, 2003). The IFR Policy also provides a framework for the determination of resource losses and other impacts in downstream areas and for compensation of affected communities for these losses and impacts.

According to the Policy, the Population at Risk (PAR) is located within a corridor of 10 km, with the river as the centre line “and the lesser of the 5km or the watershed divisions as its outer boundaries.” Communities resident outside of this corridor who can demonstrate losses may be considered for compensation on an *ad hoc* basis.

The Policy recognises important differences in the approach to compensation between upstream and downstream areas. While upstream compensation involves relatively small numbers of people with relatively large losses, downstream compensation “involves a very large number of people with relatively small losses whose magnitude and link to river flows cannot be determined precisely and for which the loss is likely to be partial, but permanent. Thus the approach to downstream compensation is based on using the best available estimates for communities rather than specific measurements for individuals” (LHDA, 2003: 11).

The IFR Policy of compensation also makes provision for:

- Mitigation and compensation to be applied differentially to downstream communities consistent with different levels of impact, so that payments are higher in river reaches closest to the dams, and diminish downstream.
- The period for which compensation will be payable is defined as “perpetuity, starting from effective date of this policy” (LHDA, 2003). The amounts payable will be in accordance with annual resource losses as estimated in the IFR studies, and calculated on the basis of the estimated annual loss per river reach, phased over eight years. The IFR per reach total will in turn be divided among the communities based on the number of households per Local Legal Entity (LLE).
- Affected communities will receive compensation for losses of river resources, including firewood and construction timber; fish resources; wild vegetables and medicinal plants and animal forage; and mitigation measures to address public and animal health impacts.
- The primary form of compensation will be cash payments by the LHDA into Local Legal Entity (LLE) accounts, to be used by the communities for their own resource replacement and/or other economic/community development programmes.
- Cash compensation payments will be complemented by technical assistance to communities to assist them in the optimal utilisation of compensation funds.

- Provision has also been made for the establishment of resource replacement programmes, should sufficient villages request this intervention.

1.4 THE INSTREAM FLOW REQUIREMENTS (IFR) STUDIES

Assessment of social and health impacts were dependent upon prior assessment of biophysical impacts. The biophysical data consisted of the main changes in key species, communities and features in the rivers as represented by the eight IFR sites, and was used to predict the likely impacts of each of the four scenarios on community livelihoods and public health.

The predicted biophysical changes were used in conjunction with the monetary value of river resources in order to estimate the losses that would be suffered by affected communities. For each scenario, the data on resource use, the prices of resources and the midpoints of the biophysical consequences were combined to derive the monetary impact of flow changes by multiplying resource use by prices and by weighting resource value using the biophysical consequences.

With the exception of sand (which was seen as being in plentiful supply), the supply of river resources was assumed to be limited in space and time, so that a reduction in the abundance of a resource would lead linearly to a reduction in the use of that resource. The socio-economic data were used to identify river resources that were of economic relevance to the affected population and only those resources that would be negatively affected were included. For example, reeds, thatch grasses and craft grasses were excluded because their quantities were expected to increase as a result of flow transformations. Sand was also excluded because its supply was thought to be sufficiently abundant for slight reductions not to affect households.

In addition to compensation costs, mitigation costs, relating to the prevention of predicted increases in disease risks, were also calculated. Mitigation costs were based on the actions required to prevent or lessen the risk of disease through measures such as the immunization of children, construction of VIP (ventilated improved pit) latrines, and health education.

CHAPTER 2

OBJECTIVES OF THE STUDY AND METHODOLOGY

2.1 DOWNSTREAM SOCIO-ECONOMIC MONITORING

The objectives of the downstream component of LHDA Contract 1204 were broadly:

- Verify the impacts on the population at risk (PAR) against the predicted impacts of the IFR Survey.
- Assess whether treaty commitments with regard to community welfare are broadly being met.
- Develop a monitoring and reporting system or programme that can be audited every five years.
- Conduct the first round of socio-economic and public health surveys based on the IFR Policy Protocols and utilizing resources from the upstream surveys.

In addition to setting out the scope of services for downstream socio-economic monitoring, Part B of the scope of services also provided a suggested public health protocol to be applied together with the socio-economic protocol that will be developed by the consultant, as well as setting out some of the broad principles of the IFR Policy that have relevance for socio-economic monitoring in downstream areas. In relation to the latter, three basic requirements are set out for socio-economic monitoring in downstream reaches:

- Distinguishing LHWP effects on public welfare from broader trends in Lesotho;
- Tracking what is being done with compensation payments and the effects of these payments on overall community welfare, and
- Assessing whether Treaty commitments regarding community welfare are broadly been met in the downstream context.

The tracking of compensation payments and their effects on community welfare are, however, not specifically mentioned among the aims and objectives of the downstream study or in the description of the tasks and activities of the project.

2.2 IFR SITES

As one of the major objectives of the study is to verify the impacts on the population at risk against the predicted impacts, the current downstream study would have to be done at one or more of the eight river reaches used by the IFR study. The eight river reaches used in the previous IFR Studies (LHDA Contracts 648 and 678) are listed below:

- IFR Reach 1. Matsoku River from the site of the proposed Matsoku Weir to the confluence with the Malibamat's o River (30 km);
- IFR Reach 2. Malibamat's o River from the Katse Bridge to the confluence with the Matsoku River (20 km);
- IFR Reach 3. Malibamat's o River from the confluence with the Matsoku River to the confluence with the Senqu River (35 km);
- IFR Reach 4. Senqu River from the confluence with the Malibamat's o River to the confluence with the Tsoelike River (125 km);

- IFR Reach 5. Sengu River from the confluence with the Tsoelike River to the confluence with the Sengunyane River (85 km);
- IFR Reach 6. Sengu River from the confluence with the Sengunyane River to the Lesotho/South African border (140km);
- IFR Reach 7. Sengunyane River from the site of the proposed Molehe Dam to the confluence with the Lesobeng River (90 km);
- IFR Reach 8. Sengunyane River from the confluence with the Lesobeng River to the confluence with the Sengu River (40 km).

To these IFR sites, a ninth site was added as a control site on the Matsoku River upstream of the Matsoku Weir. After completion of the LHDA 678 study, biophysical monitoring was discontinued at IFR 8 “because of difficulties with obtaining accurate hydrological data and difficulties with access” (LHDA 1237-04/05: 3). The sites can be divided into *proximal* sites (those that are closer to the dams and are therefore more likely to experience the impacts of modified flows) and *distal* sites (those that are more distant from the dams and therefore less likely to experience the impacts of modified flows). Sites 1, 2, 3, 7 & 8 are considered proximal sites, while Sites 4, 5 and 6 are distal. All of these factors played a role in the selection of the five sites for socio-economic monitoring done by the present study (Contract 1204).

2.3 METHODOLOGY¹

The primary purpose of the downstream survey was to collect information regarding the usage of riverine resources by communities living within a five-kilometre zone of the rivers downstream of the main LHWP reservoirs. In addition, information was collected on household characteristics, income sources, and nutritional and health issues.

2.3.1 Questionnaire development

Contract 1204 developed a comprehensive set of questionnaires for use in the ‘upstream’ survey to evaluate how households directly impacted by the construction of the dams were coping. Items covered included demographic issues, livelihoods and income sources, nutrition and food security, public health issues, services and amenities. Most of these issues were applicable in the downstream component of the study. Utilizing the existing questionnaires secured the advantage of using a tried and tested research tool. An additional advantage was that the interviewers had been exhaustively trained to use these questionnaires. However, for the ‘downstream’ survey, certain additional aspects had to be covered. These related mainly to the utilization of natural resources in the respective river reaches.

The final ‘downstream’ questionnaires were translated into Sesotho for use in the field and printed. The following questionnaires were used in the various components of the study.

- A **household questionnaire** to collect information of the inhabitants e.g. their characteristics, income, food security, amenities and the utilization of riverine resources.
- A **questionnaire for female respondents** between the ages of 15 and 49. The questionnaire had sections dealing with reproductive health, maternal and child health, as well as anthropometric information of the woman herself and her young children and enquiries about visits to the nearest main river.

¹ For a more detailed description of the methodology employed in the study, see Chapter 3 in HSRC 2007d (Volume 1 of the present study).

- A questionnaire for male respondents to collect health related and anthropometric information from male respondents aged 15-54. Copies of the questionnaires can be found on the project compact disk.

2.3.2 Study area

The terms of reference of the downstream study specified that the monitoring of downstream effects should be done in the so-called 'proximal sites', i.e. those reaches not too distant from the main reservoirs, since the impacts as a result of reduced river flows diminishes markedly with distance. One of the objectives of the current downstream study is to make comparisons between resource utilisation (as reported by the respondents) and the availability of natural resources (as reported by the biophysical monitoring exercises carried out by LHDA Contract 1237). Due to accessibility problems, no biophysical monitoring was done in IFR 8. Therefore, it made less sense to conduct a socio-economic survey in IFR 8.

During the aforementioned review of IFR studies in the LHWP, a suggestion was made to conduct the survey in one of the control IFR reaches. These control sites are above the dams and are therefore not impacted by reduced flows. This suggestion had merit since by including a 'control' site, the findings would provide some comparative measures. It was therefore decided to conduct the survey in IFR 9, i.e. in the Matsoku River valley, upstream of the Matsoku Weir.

The IFR reaches consist of a zone 5 km on both sides of the river. For the purpose of identifying villages, 1:50 000 topographic maps were made available by the LHDA GIS Centre. On these maps two boundaries were drawn adjacent to the river: A boundary line incorporating the 5 km zone on both sides of the rivers and an inner boundary of 2 km from the rivers². Using these maps, a list was made of villages by IFR reach within each distance zone from the river. The list of villages was provided to the sampling statistician to draw the sample. In addition, recent ortho-photographs were obtained. Although village names did not appear on these photographs, they were useful in indicating exactly where the villages were situated, to identify tracks, etc.

2.3.3 Sample design

The sample had to be drawn in five discreet areas, namely IFR 1, IFR 2, IFR 3, IFR 7 and IFR 9. Each of the IFR reaches was further subdivided into two zones:

- i) Villages within 2 kilometers from the river
- ii) Villages between 2 and 5 kilometers from the main river.

In each of these final subdivisions villages were geographically ordered in a systematic fashion and a provisional weight allocated and villages selected.

2.3.4 Data collection

A short training session was held to introduce the interviewers to the questions on riverine usage. The same equipment was also used in the downstream areas, e.g. electronic scales, baby boards and length sticks.

² The area impacted by reduced flows was defined as 5 km on both sides of the river. However, one expects that households living 5 km from the river would use the river less frequently than for example a household living 1 km from the river. Villages were therefore stratified by distance from the river. A disproportional sample was drawn. Approximately 70 % of households drawn were in the 0-2 km zone, with the remainder in the 2-1-5 km zone.

The teams started work on the downstream survey on 11 October 2006. The first step in the data collection process was to visit a village on the sample list and identify and count the households in the village. Thereafter the households where interviews were to be conducted were selected by means of a systematic sample.

Fieldwork in the downstream areas was complicated by accessibility problems. In IFR 2 and 3 a fair proportion of villages were near the main road linking Katsse and Thaba Tsoka. However, many villages were located in hard-to-reach areas. Interviewers had to walk to get to these villages and horses were used in certain instances. Heavy rains in the second half of October made movement more difficult. Tracks became inaccessible due to muddy conditions. As the safety of the teams was a prime concern, drivers were instructed not to drive on tracks if they were deemed unsafe (steep slopes, washed out tracks, muddy conditions, etc.). The teams were unable to reach a number of villages in the time allocated for the study. This was mainly because a bridge had been washed away below the Katsse Dam during the heavy rains in October, making it impossible to reach the eastern bank of the Malbanats'o River. The time available also made it difficult to reach all of the villages. In a few cases the teams were unable to find the village as listed.

2.3.5 Data capturing and data management

The questionnaires of the downstream survey were sent to a specialized data-capturing firm. Before data entry could commence, the questionnaires were first edited and coded. The data-capturing firm utilized a batch entry system for data entry. Verification was done on 100 % of the questionnaires. The downstream data was captured within five weeks.

The captured data was stored in an ASCII format before delivery to the data management consultant of Contract 1204. After receipt of the raw data, three datasets were created:

- i) Household dataset,
- ii) Female dataset, and
- iii) Male dataset.

Besides editing and data cleaning, other *ad hoc* data (e.g. the nutrient data base) had to be linked to the female dataset.

The calculated sampling weight per village was added as a variable to the datasets.

2.3.6 Analysis

The statistical programmes used to analyse the data were SPSS (www.spss.com), JMP (www.jmp.com) and R (an open source statistical analysis package - <http://cran.r-project.org>).

2.4 OBJECTIVE AND LAYOUT OF THIS REPORT

This volume specifically deals with the survey findings regarding the availability of services to the population living in a five kilometre corridor alongside the proximal downstream reached downstream from the major Phase I reservoirs of the LHWP.

CHAPTER 3

COMMUNITY SERVICES

3.1 INTRODUCTION

The various proximal downstream areas are typified by their relative remoteness and inaccessibility, largely as a result of topography. Although, the LHWP had some positive spin-offs such as the construction of roads, these valleys remain largely on the periphery of the Lesotho national economy. This is shown the characteristics of the population (low employment rates and income levels) and by the relative lack of services and amenities compared to other areas in Lesotho. Even in comparison to the upstream LHWP project areas the various IFR reaches seem to be at a disadvantage.

However, the Lesotho government has done well in providing certain basic services to the inhabitants of these areas, as shown by the high levels of use and access to health facilities (as discussed in Chapter 4 of Volume 3) and schools (see Volumes 1 and 2 of the present series of reports). This report provides a brief overview of the availability and usage of other basic services and amenities in the selected downstream areas.

3.2 INFRASTRUCTURE

3.2.1 Roads

As in many parts of the Highlands roads the areas downstream of the LHWP reservoirs are in general not well developed. This is exacerbated by the topography of the area, i.e. village located in the various river valleys.

Regarding the various IFR reaches the following apply: Most villages on the western bank of the Malibamatso River in IFR 2 and 3 are located alongside or near the road from Thaba Tseka to Katse. This gravel road was constructed during Phase 1A of the LHWP. Villages on the eastern bank of the Malibamatso River are significantly less well served by roads. During October 2006 a connecting bridge over the Malibamatso River was washed away. In IFR 1 a rural road network connects many villages to Katse, while in IFR 9 a track on the eastern bank of the Matsoku River links a number of villages to Ha Seshole. However, the majority of villages in IFR 9 are not near any road. Similarly, IFR 7 is not well served by roads, due to the steepness of the Senqunyane valley. Tracks lead to the villages below the Mchale Dam and in the valley below Ha Marakabei.

3.3 SERVICES AND AMENITIES

Of interest to this study is the source of domestic water supply. Table 3.1 shows the water sources for daily domestic purposes. Almost half of the households in the downstream areas source their water from an open well or unprotected spring. Community water systems are used by a quarter of households. In IFR 2 and 7 nearly a third of households were able to collect water from a community tap. Covered wells or boreholes are the third most important source of water for household use (nearly 20%). An insignificant proportion used water from the main river or a tributary for domestic purposes.

Table 3.1: Source of drinking water, by IFR and distance from the river, 2006
(Percentages)

Water facility	IFR									Distance from river			All areas
	1	2	3	7	9	≤2 km	2-5 km	5-10 km	10-15 km	15-20 km	20-25 km	25-30 km	
Piped to stand	0.0	0.6	6.1	1.3	0.0	1.7	3.1						2.4
Community tap	16.2	34.3	26.2	33.9	7.2	23.5	27.8						25.5
Covered well / borehole	27.8	22.7	10.9	22.8	19.7	17.9	21.1						19.4
Open well/spring	53.1	34.9	54.8	37.4	68.6	51.4	46.0						48.9
River	0.5	1.3	0.0	3.6	0.0	2.4	0.0						1.2
Tanker	2.4	5.2	0.4	1.0	4.5	3.1	1.0						2.1
Other	0.0	0.0	1.5	0.0	0.0	0.0	1.0						0.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0						100.0

Respondents were also asked what water sources they have ever used in the past (for instance during a drought). Table 3.2 shows that under those circumstances, use of the river or a tributary increases, particularly during droughts.

Table 3.2: Ever use of a specific water source by households, according to IFR and distance from the river, 2006
(Percentages)

Water source	Usage	IFR									Distance to the		All areas
		1	2	3	7	9	≤2 km	2-5 km	5-10 km	10-15 km			
Piped to stand	No	97.0	99.2	97.6	98.6	100.0	98.1	98.5					98.3
	Yes	3.0	0.8	2.4	1.4	0.0	1.9	1.5					1.7
Community tap	No	83.0	63.5	77.8	81.7	92.4	82.8	77.1					74.9
	Yes	16.4	44.3	26.9	28.6	6.8	23.0	27.2					25.1
Covered well	No	60.7	68.5	82.6	69.2	75.9	74.3	71.8					73.1
	Yes	38.3	36.0	12.7	31.5	24.1	26.0	26.0					26.9
Open well	No	38.4	43.1	29.8	46.5	31.2	36.0	39.0					37.5
	Yes	65.3	68.2	71.1	53.3	70.0	68.4	61.0					62.5
Main river	No	83.6	86.2	96.2	87.6	84.0	85.1	93.3					89.1
	Yes	17.4	13.8	1.7	14.5	13.6	14.9	6.2					10.9
Tributary	No	88.9	79.7	84.8	91.7	80.7	87.4	84.9					86.2
	Yes	10.1	21.7	14.9	9.7	18.9	12.9	15.4					13.8
Pond	No	97.3	91.9	98.7	94.8	96.3	94.5	98.2					96.3
	Yes	1.7	8.1	1.3	4.0	2.5	4.9	1.2					3.7
Rainwater	No	85.5	82.0	93.5	92.4	93.5	90.5	90.9					90.7
	Yes	13.9	20.8	5.3	7.6	5.3	9.6	8.4					9.3
Tanker	No	95.1	83.6	97.9	86.0	93.2	89.4	94.5					91.8
	Yes	4.7	18.0	2.0	13.7	5.6	10.4	5.6					8.2

Nearly a fifth of households had used the main river in the past as a source for domestic water. As expected, distance from the main river plays a role in the utilization of this resource. Only 6 % of households situated more than 2 kilometers away from the main river, have ever used the river as a source for domestic water.

The findings of the 2006 survey is largely consistent with the results of the earlier socio-economic survey conducted in the downstream areas in 1999, as shown in Table 3.3.

Table 3.3 Survey results for the main water supply systems for domestic purposes, 1999

	Percentage of HHs getting water from:						
	Taps all year	Covered spring all year	Uncovered spring all year	River all year	River during dry season (3 months)	River during drought	
IFR 1	30.6	27.8	30.6	2.8	12.2	4.9	
IFR 2	24.2	18.6	40.0	0.5	2.3	1.0	
IFR 3	25.6	24.2	31.6	0.5	---	0.5	
IFR 4	41.6	9.3	35.4	0.4	1.3	1.3	
IFR 5	53.0	2.3	33.5	---	0.5	2.8	
IFR 6	51.3	6.4	12.7	0.4	11.9	33.1	
IFR 7	---	29.5	42.9	9.2	8.3	23.5	
IFR 8	2.4	18.9	61.7	0.6	2.9	8.7	
Overall	41.2	11.0	26.5	1.1	6.2	16.4	

*Source: Boehm and Hall 1999: 37

On average household members spent half an hour to fetch water for domestic purposes (Table 3.4).

Table 3.4: Average time spent (in minutes) to reach the water source of the household

1	2	IFR			Distance from the river		Total
		3	7	9	≤ 2 km	2-5 km	
29.5	35.6	28.5	24.8	36.0	29.9	29.0	29.5

As shown in Table 3.5, more than 60 % of households in IFR 1, 2 and 9 spent more than 15 minutes getting to the water source.

Table 3.5: Distribution of households according to the time spent to reach their water source (Percentages)

Time categories	IFR			Distance from the river		Total
	1	2	3	7	9	
Under 15 min	32.5	36.2	50.1	50.2	30.9	43.8
Over 15 min	67.5	63.8	49.9	49.8	69.1	56.2
Total	100.0	100.0	100.0	100.0	100.0	100.0

Table 3.6 shows the primary energy sources used by households for cooking, heating and lighting. Dung is the primary source of energy in nearly all areas for cooking purposes (56 %) followed by wood (40 %). For heating purposes, dung and wood are nearly equally important.

Paraffin is the energy source of choice for lighting in all areas. 'Modern' sources of energy, e.g. gas and electricity, are nearly totally absent from households in the downstream areas.

Table 3.6: Primary energy sources used by households, according to IFR and distance to the river
(Percentages)

Energy source	IFR					Distance from the river		All areas
	1	2	3	7	9	≤2 km	2-5 km	
For cooking								
<i>Dung</i>	59.0	59.8	50.9	65.5	41.7	55.2	57.1	56.1
<i>Wood</i>	38.9	37.0	43.9	34.5	47.0	40.0	40.2	40.1
<i>Straw</i>	0.7	2.0	2.1	0.0	11.3	4.1	0.7	2.5
<i>Paraffin</i>	0.8	0.0	1.8	0.0	0.0	0.3	1.1	0.7
<i>Gas</i>	0.7	1.1	1.2	0.0	0.0	0.4	0.9	0.6
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
For heating								
<i>Dung</i>	47.4	43.3	49.2	35.1	38.0	42.3	43.1	43.7
<i>Wood</i>	48.1	52.1	41.7	64.6	43.9	48.4	53.3	51.9
<i>Straw</i>	1.6	2.0	2.5	0.0	15.4	5.0	1.3	3.4
<i>Paraffin</i>	1.4	1.1	1.7	0.0	0.0	0.5	1.4	0.9
<i>Coal</i>	0.0	0.4	0.3	0.0	0.0	0.2	0.1	0.2
<i>Gas</i>	0.0	0.0	0.0	0.0	0.3	0.1	0.0	0.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
For lighting								
<i>Wood</i>	0.9	0.0	0.0	0.0	0.8	0.1	0.4	0.2
<i>Straw</i>	0.0	0.4	0.3	1.3	1.5	0.5	0.9	0.7
<i>Paraffin</i>	82.1	86.2	85.0	70.4	81.8	80.9	80.5	80.7
<i>Candles</i>	16.3	13.4	12.9	29.0	15.2	18.5	18.2	18.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Eighty percent of households in the study area do not have a toilet – see Table 3.7. It is only in IFR 2, 3 and 7 where a sizable proportion of households have a pit or VIP latrine (between 16 % and 21 % of households).

In Chapter 4 of Volume III of the present series of reports, more information is provided on the lack of sanitation facilities; the source of drinking water and the prevalence of water-borne diseases, in particular diarrhoea. The availability and use of health services are also covered in that chapter. The use of education facilities is covered in Chapter 5 of Volume II.

Table 3.7: Sanitation facilities available to households, by IFR reach and distance from the river
(Percentage)

Type of toilet Facility	IFR					Distance from the river		All areas
	IFR 1	IFR 2	IFR 3	IFR 7	IFR 9	< 2 km	2-5 km	
Flush toilet	0	0.0	3	0	0	0	2	3
None	92	79	80	80	90	84	82	80
Pit latrine	6	7	6	11	1	7	7	6
VIP	2	14	10	9	8	9	9	10
TOTAL	100	100	100	100	100	100	100	100

3.4 BUSINESS ENTERPRISES

During the household survey, respondents were asked if their household was involved in any business enterprise. In total 5.7% of households in the downstream areas reported they were operating some kind of a business (see Table 3.8). Further analysis showed that the business activities can be divided into two broad categories, i.e. those households that manage a business enterprise permanently, i.e. throughout the year (2.1% of households) and households that are involved in a business enterprise during parts of the year – probably due to the seasonality of the product (3.6% of downstream households).

A higher proportion of households in IFR 2 (4.7%) reported operating a permanent business compared to households in the other IFR reaches. A plausible reason for this may be their location near the Thaba Tseka – Kaise road that would improve marketing and facilitate the transport of potential clients.

Table 3.8: Businesses enterprises reported by households in the specific downstream areas of the LHWP
(Percentage)

Households running a business	IFR reach					All downstream areas
	IFR1	IFR2	IFR3	IFR7	IFR9	
No business	94.2	88.0	95.2	95.9	95.1	94.3
Temporary business	4.4	7.4	1.8	4.1	2.6	3.6
Permanent business	1.4	4.7	3.0	0.0	2.3	2.1
Total	100.0	100.0	100.0	100.0	100.0	100.0

In terms of distance to the river no significant differences is observed in the operation of businesses (see Table 3.9). Comparing the downstream areas and the upstream project areas of the LHWP the following conclusions can be drawn. In the Mchale project area, 2.5% of households reported operating running a business enterprise during the entire year while another 4.4% reported they operated a business for a period between one and eleven months in a year. In the Phase 1A LHWP area, a higher proportion of households (4.3%) reported a permanent business, while another 4.4% operated an enterprise for a part of the year.

Table 3.9: Businesses enterprises reported by households downstream from LHWP reservoirs, according to the distance from the river and 'upstream' LHWP areas
(Percentage)

	Distance from the river		All downstream areas	Mchale project area	Kaise/Muela project area
	< 2 km	2-5 km			
No business	93.7	95.3	94.3	93.1	91.3
Temporary business	3.9	3.1	3.6	4.4	4.4
Permanent business	2.5	1.5	2.1	2.5	4.3
Total	100.0	100.0	100.0	100.0	100.0

However, given the low income levels of households in the downstream areas (see Volume II of the present series of reports), the downstream areas cannot support local business enterprises on a large scale.

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